Official Journal of the Illuminating Engineering Society.

Light and Lighting

Incorporating "The Illuminating Engineer."

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Law—and Order

At the I.E.S. meeting on December 8 (see p.154) Mr. A. G. Higgins made out a good case for legislation on lighting.

Law for factory lighting we already have; law on normal street lighting we should surely have had but for the outbreak of war (and meantime we endure, inevitably, abnormal darkening imposed by law); law on lighting in schools we ought to have had years ago.

All this law should be on the lines adopted for factories—an over-riding *law* requiring "adequate and suitable lighting" in general terms, supplemented by *orders* specifying details and subject to adjustment from time to time.

No doubt there will be other laws, perhaps for lighting in the home, though we must always remember that the Englishman's home is still a castle. In any case, law must be aided by specification and guidance.

Remember also one thing. How comes it that the I.E.S. Code has become virtually law in war time? Because, when war broke out, *it was there ready*. Therefore, get to work now. Make certain that when peace comes (perhaps quite suddenly and unexpectedly), *all the data, all the reports, all all the specifications we need are ready too.*

Public Lighting Equipment

A timely circular, recently issued by the Association of Public Lighting Engineers, warns those responsible for lighting departments not to " let things go "—to prepare, even now, for the restoration of public lighting when the hour arrives. Therefore, let lanterns, controllers, time switches, chokes, and condensers be stored, reflectors and metal surfaces cleaned, pipes and burners cleared of obstructions, wiring examined, metal painted, and rust prevented—everything overhauled at regular intervals so as to be immediately ready for service. In particular, the pamphlet urges, poles and pillars should not be scrapped—unless accidentally broken. They will be needed to carry lights for a long time after the war is over.

All this is sound advice. But we would go further. Who can say with certainty that some restoration of street lighting will not be called for, even before the war is over? The time is not yet. But already circumstances are changing. If, as we have been warned, the war may be a long one, all the more reason to be prepared for altered conditions and a possible demand for something intermediate between the present obscurity and pre-war lighting.

Lighting experts, therefore, should not be caught napping. They should be prepared with plans and suggestions for other grades of street lighting, specified on the same scientific basis as " synthetic starlight," but designed to give ten or even a hundred or more times the present value in the simplest and most economical way.

Office Lighting

It has long been urged that " adequate and suitable lighting " should be compulsory in offices, as in factories. Certainly after the war there will be great developments in this field. The " Recommended Practice of Office Lighting " in *Illuminating Engineering* (Sept. 1942, p. 449) is therefore well worthy of study. We mean to refer more fully to this contribution. Meantime several points may be noted. In general, supplementary lighting is not advised. Four grades, 5, 10, 25 and 50 foot-candles are mentioned. General illumination of 30-50ft.-c. is, however, provided in most of the offices illustrated, and the methods of lighting are invariably either indirect or of a highly diffused character.

The I.E.S. Leicester Group

The I.E.S. Leicester Group, one of the most recently formed, has made good progress under the keen chairmanship of Mr. Thomas Wilkie, the public lighting engineer of Leicester, during its initial period of existence. In one respect it is a model—the balance of interests on its committee, which includes representatives of gas and electric supply, local authority, electrical contractors, makers of lighting equipment, factory inspectorate, works engineers and architects. It is also fortunate in having cordial relations with local gas and electric supply interests, both of whom have placed their lecture theatres at the disposal of the group on several occasions.

At the annual meeting on December 12 the honorary secretary, Mr. R. Montgomery, reported that seven meetings had been held during the present year, the greatest attendance (about seventy) being obtained on the occasion of the lecture on "The Poetry of Light," by Mr. R. Gillespie Williams. We gather that the meeting on October 20, when Mr. C. J. Allderidge, Mr. Howard Long, Dr. Macdonald, and Mr. F. Chipperdale formed themselves into a "Brains Trust" was also a very successful one.

At the annual meeting on December 12, which was preceded by an informal luncheon, the existing officers and council were re-elected, no doubt a wise step in the early stages of a group. Subsequently Mr. J. S. Dow, who had come up from London for the purpose, gave an address in which he combined some of the ideas presented in Mr. Ackerley's recent address on "Seeing is Believing," with his own impressions of the development of the Society. He recalled the importance attached by the first president of the Society, Professor Silvanus P. Thompson, to its educational mission, and the closing injunction in his inaugural address to "diffuse the light." He recalled the pioneering efforts of days when there were few and primitive photometers, little data on lighting, and a comparative scarcity of artificial light, which led undue emphasis to be placed on economy. He reviewed outstanding incidents in the history of the Society, such as the I.C.I. meeting in Britain in 1931, with its marvellous display of floodlighting, and he contrasted experience in the last great war—during which the Society experienced great difficulties—with those of the present time, during which the membership had almost doubled. Such advances as the introduction of legislation for better lighting, and the recognition of the value of the services of experts on illumination by Government departments, local authorities, and public utility and commercial undertakings depended ultimately on the formation of public opinion. The work which the I.E.S. hoped to perform in connection with lighting reconstruction should help in this direction.

Forthcoming I.E.S. Meetings

1943.

Jan. 12th. Mr. H. C. Weston on **A Basis for a New Lighting Code.** *(I.E.S. Sessional Meeting to be held at the E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C.2.)* **5 p.m.**

Jan. 6th. Conversazione and Tea. **Address** by The President (Mr. R. O. Ackerley). *(Meeting of the I.E.S. Newcastle Centre (North Eastern Area), to be held in the Minor Hall, Oxford Street, Newcastle-on-Tyne.)* **5.30 p.m.**

Jan. 14th. Mr. J. W. Howell on **Lighting in the Cotton Industry.** *(Meeting of the Manchester Centre (North Western Area) to be held in Reynolds Hall, College of Technology, Sackville Street, Manchester.)* **2.30 p.m.**

Jan. 14th. A Lighting Brains Trust Meeting with Prof. T. D. Jones, F.G.S., M.Sc., Ph.D., as "Question Master." *(Meeting of the I.E.S. Cardiff Group (South Wales Area) to be held at Cardiff Corporation Demonstration Theatre.)* **3 p.m.**

Lighting Problems

Summary of a Discussion before the I.E.S. Nottingham Centre on October 2nd.

Several typical lighting problems were presented and discussed at the meeting of the I.E.S. Nottingham Centre on October 2, Mr. G. D. Johnson presiding.

Pedestrian Crossings

The first of these—" The Identification of Pedestrian Crossings in the Blackout," presented by Mr. E. Howard—is of special interest at the moment. In the course of a lively discussion various devices were suggested, including (1) Illuminated studs across the crossing, (2) White strips across the road, (3) Illuminated kerbs at either side of the crossing, (4) Fan-shaped beams of light thrown across the crossing, (5) Illuminated beacons, and (6) Studs treated with fluorescent paint and irradiated by " black lamps " (furnishing U.V. radiation).

Mr. Howard's own solution, which is seen in the accompanying illustration, was more comprehensive. A main feature was the use of two letter " P's," each 4 ft. in length, marked out with reflecting studs, and let into the roadway 60 ft. away from the crossing. It was further suggested that the actual crossing and the approach to it on each side should be surface dressed with light granite chippings, or painted with white road-marking paint, so that the figures of pedestrians might be revealed in silhouette against the light background. As a further precaution amber studs, fitted on the crossing facing the oncoming traffic, were suggested.

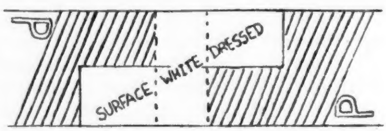
Sewing Machines.

The second problem, dealt with by Mr. J. B. Saunders, related to the Lighting of Sewing Machine Benches in a room 34 ft. long and 19½ ft. broad, with a D.C. 200-V supply (10 amps.) only available. Suggested solutions included: (1) Four 100-W lamps in each gangway, and 6-V 12-W needle point lamps per machine, (2) A rotary converter and 5-ft. tubular fluorescent lamps, (3) Cap lamps fitted to the heads of machinists, and (4) Angle reflectors mounted below the line of sight.

Mr. Saunders pointed out that low voltage lamps could not conveniently be operated on a D.C. circuit. He therefore installed three 200-W lamps in dispersive reflectors, spaced 5 ft. 3 in. apart and mounted 6 ft. 8 in. high, down the centre of each bench. Adequate shadow-free illumination at the needle point was thus obtained.

A Still Life Room in an Art School.

Other problems included the provision of Additional Illumination in a Transport Shed, which was solved by Mr. H. D. Smith with the aid of lamps mounted in parabolic angle reflectors, and the Illumination of a Still Life Room in a College of Art. The students occupied various



Showing Method of Defining a Pedestrian Crossing.

positions in this room but usually had their backs to the window which covered almost the whole of one wall. Professor Cotton suggested the imitation of daylight by the aid of 5-ft. fluorescent lamps, Mr. Caunt a continuous trough reflector round three sides of the window, Mr. Cresswell the use of parabolic angle reflectors, one row above the window, the other down the centre of the room.

Mr. T. E. S. Thwaite, who introduced this problem, found his solution in the use of twelve 500-W " Glassteel" diffuser fittings installed above the window and tilted towards the south wall. The illumination was adequate, and owing to the large diameter of the fittings, good diffusion and satisfactory shadow conditions were obtained.

INDEX TO "WHERE TO BUY"

(The numbers are those attached to individual entries in "Where to Buy")

Literature on Lighting

We take this opportunity of acknowledging the services of the following members of the Illuminating Engineering Society who have contributed to "Literature on Lighting" during the past year:—S. S. Beggs, J. S. Dow, W. E. Harper, R. G. Hopkinson, C. Morton, A. E. Schull, J. Score Smyth, and H. J. Turner.

Obituary

Mr. THOMAS NISBET

We record with deep regret the death of Mr. Thomas Nisbet, which occurred on November 30. Mr. Nisbet joined the Illuminating Engineering Society in 1936 and was recently elected a Fellow. He was attached to the General Electric Company, Ltd., and had acquired a considerable knowledge of the lighting of docks, on which subject he prepared a paper for presentation to the I.E.S. on November 10. He was, however, unable to attend the meeting owing to illness which unfortunately terminated fatally shortly afterwards.

Post-War Legislation on Lighting

Discussion at a Sessional I.E.S. Meeting held on Tuesday, December 8, 1942.

At an I.E.S. meeting held in the House of the Royal Society of Arts, London, on December 8, there was an interesting discussion on post-war lighting problems, introduced by Mr. A. G. Higgins, who has the distinction of being (so it is believed) the only I.E.S. member who is also a Barrister-at-Law.

The introductory address, whilst expressing Mr. Higgins's own ideas, as a personal contribution always must do, was based partly on the work done by the Society's Sub-committee on Legislation in Relation to Lighting Reconstruction, of which Mr. Higgins is a member, and to which a brief reference was made by the President (Mr. R. O. Ackerley), who presided over the meeting.

Education, Legislation, and Force of Example

In his opening remarks Mr. Higgins pictured the vast tasks to be undertaken in the lighting field after the war and the great opportunity for advances and improvements then presented. It is necessary, firstly, to determine exactly what lighting conditions are desirable in the future and, secondly, the ways and means of securing these conditions during the period of reconstruction. The President, in his recent address, had emphasised the importance of dissemination of knowledge on illumination and had recalled the emphasis placed on this by the Society's first President, Professor Silvanus P. Thompson, in 1909. The future of lighting must depend, in the long run, on public opinion.

There are three methods of securing the desired results: by education, legislation, and force of example. Mr. Higgins pointed out that hitherto reliance has been placed mainly on the first method. With the important exception of industrial lighting there was little positive control of lighting by legislation.

Factories, Offices, and Streets

Mr. Higgins then proceeded to review various fields of lighting in which improvement in the future might well be aided by legislative measures. He recalled the present position in connection with factory lighting, and urged that offices, for which there is at present no provision, ought to be brought within the scope of the Factory Act. In the field of public lighting the position is that, apart from Scotland, there is no compulsion. The Public Health Act of 1875 empowers Highway Authorities to light streets, but it does not *require* them to do so. Allusion was made to various Acts in England and Scotland which have a bearing on street lighting. In none of these is any standard of illumination laid down—though the report of the M.O.T. shortly before the outbreak of war made proposals in regard to a common standard of illumination for classified roads.

Shop Lighting and Display Lighting

In shops the commercial advantages of well-lighted premises usually result in a high order of artificial lighting, though the natural lighting is often faulty. It has also been urged that good lighting should be provided not only in parts of shops where goods are sold, but in other parts used by workpeople. The

Shop Act, 1934, requires "adequate and suitable lighting," but no guidance is given in regard to interpretation, nor is the Secretary of State empowered to prescribe actual standards. In passing, Mr. Higgins also made a reference to the control of display lighting from the amenity side, for example, in connection with illuminated signs. He thought that those in the sign industry would not object to reasonable and judicious limitations to this end; they complained, however, that existing legislation in various towns varied so greatly and that much of it was archaic or illogical or difficult to interpret.

School Lighting

In State-aided schools some consideration is given to lighting. Thus the Board of Education may make financial grants conditional on certain requirements being satisfied, but there is a complete lack of legislation, and in the case of schools that are not State-aided little control seems to be exercised in regard to lighting. Mr. Higgins suggested that in future the matter might be dealt with by greater stringency in the matter of grants and by the passing of legislation investing the proper authority (presumably the Board of Education) with powers similar to those which the Factory Acts assign to the Ministry of Labour. The preparation of a suitable code of lighting should present no difficulty, and Mr. Higgins enumerated some conditions that should be borne in mind.

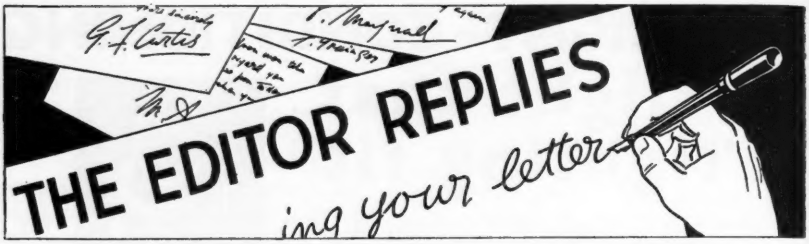
Flats and Private Houses

In conclusion, Mr. Higgins turned to the problem of private dwellings and the contention that every citizen should be entitled to good lighting, just as he should be entitled to pure water, fresh air, and proper sanitation. But unless some new economic system whereby lighting is provided as a service is introduced, it seems difficult to exercise control in the same way as for schools and public buildings. In the case of houses and flats put up by local authorities and speculative builders in large estates legislation might at least ensure the *means* of obtaining suitable and sufficient lighting. Much may, however, be done by education and by the issue of suitable B.S.I. specifications and appropriate codes of practice.

Discussion

There was a good discussion. On this occasion the method was adopted of asking members of the society and others to speak on certain aspects with which they were specially conversant. Thus Sir Duncan Wilson, formerly H.M. Chief Inspector of Factories, reviewed progress in legislation on industrial lighting and its application after the war, Mr. Thomas Wilkie, Public Lighting Engineer for Leicester, discussed street lighting, and Mr. E. G. Savage (L.C.C. Education Department) dealt with school lighting. Mr. Percy Good, director of the British Standards Institution, explained the part played by specifications and the steps that are now being taken to formulate codes of practice for the future. Others who joined in the discussion included Mr. P. V. Burnett, who spoke as an architect, Mr. F. C. Smith, who touched on the problem of securing proper lighting in dwellings, and Mr. J. H. G. Pearce, who confirmed what had been said in regard to the difficulties imposed by existing legislation on illuminated signs.

Taken as a whole the discussion, which will appear in full in the I.E.S. Transactions, was a very informative one.



I have been asked how to produce a strictly **parallel beam,** 2 in. diam., from an ordinary service lamp. Anything approaching an "exactly" parallel beam demands a point source. A fairly useful beam can, however, be obtained by placing a filament lamp (preferably of the type used for motor-car headlights) at the focus of a lens or train of lenses in the manner of the optical lantern.

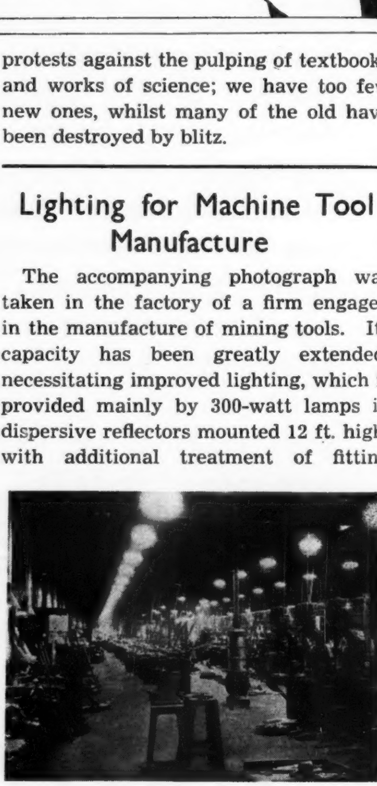
Diaphragms would be necessary at intervals to cut down stray rays and the emergent beam, whilst fairly parallel (i.e., of small dispersion) might not contain much light. To get a powerful beam an arc or a super high pressure mercury lamp—or other source of great brightness but very small dimensions—should be used.

There seems to be a notion that the authorities have demanded the **sacrifice of poles and pillars** supporting street lamps for scrap. A leaflet issued by the A.P.L.E. (see also p. 150) states that there is no such demand yet. If it were, it would rightly be resisted. Such poles will be needed to carry lamps when lighting is restored—certainly for a long time after the end of the war.

A demand for **scrapping everything**—from teapots to generals or members of the Cabinet—is an instinctive reaction of the short-sighted in times of pressure. Educational bodies have likewise issued protests against the pulping of textbooks and works of science; we have too few new ones, whilst many of the old have been destroyed by blitz.

Lighting for Machine Tool Manufacture

The accompanying photograph was taken in the factory of a firm engaged in the manufacture of mining tools. Its capacity has been greatly extended, necessitating improved lighting, which is provided mainly by 300-watt lamps in dispersive reflectors mounted 12 ft. high, with additional treatment of fitting



benches by 100-watt lamps in vertical elliptical reflectors mounted 2 ft. 6 in. above bench level. The service illumination is 12-15 ft.c., rendering local lighting unnecessary. In the inspection room, however, 30 ft.c. is provided. This new lighting was planned by the Illuminating Engineering Dept. of the Metropolitan-Vickers Electrical Co., Ltd., and has given great satisfaction.

Colour Group Discusses Fluorescence

The programme for the tenth meeting of the Physical Society Colour Group, held on December 11, was a very full one, consisting of four papers on different aspects of fluorescence, each read by an expert in his own particular field. The meeting was held at the E.L.M.A Lighting Service Bureau and, as usual when papers on fluorescence are announced, there was an unusually large attendance.

The introductory paper was by Dr. John W. Strange, of Thorn Electrical Industries, Ltd., who, although taking as his title "Fluorescent Materials and their Colours," actually covered a wider field, and, in fact, gave an excellent summary of the whole subject of fluorescence. He dealt first with nomenclature which, he said, was still somewhat confused in certain respects. He then went on to mention the two practical applications of fluorescence which are of major practical importance at the present time, viz., in cathode ray tubes, either for television or for infra-red signalling, and in discharge lamps. He mentioned that the instantaneous loading of the fluorescent material in a television tube might be as high as 25 kw/sq. cm. He then described the effects of various activators on the different classes of phosphors and the power of exceedingly minute quantities of a "killer" to ruin the fluorescence of a sample of material. In the final part of his paper he discussed the mechanism by which the light was emitted from a fluorescent material and drew a distinction between (a) fluorescence proper, which was the emission of visible light while, and only while, the material was being irradiated by the exciting (generally ultra-violet) light and (b) phosphorescence, the emission which persisted after removal of the exciting radiation. The former phenomenon, he said, depended only on the probability of the return of an excited electron to its normal state and could not be influenced by such conditions as temperature, while phosphorescence was very dependent on temperature and the relation between the two provided valuable information regarding the nature of the action which was taking place.

Fluorescent Materials

Mr. H. G. Jenkins, of the Research Laboratories of the G.E.C., in a paper entitled "Commercially Useful Fluorescent Substances," dealt with the various types of materials which were of commercial importance, and mentioned that for discharge lamps alone the output of fluorescent material required at the present time was in excess of 100 tons per annum. This material was in the far larger and more important of the two classes into which phosphors could be divided, the inorganic class. The chief application of the organic fluorescent substances, of which anthracene was typical, was to the dyeing of textiles, although the speaker did mention some other interesting uses to which these materials had been put. Organic materials were almost exclusively fluorescent and only very rarely phosphorescent; they were mainly excited by the near ultra-violet.

The large and very important group of inorganic phosphors were again divided by Mr. Jenkins into two classes, viz., those excited by short-wave ultra-violet radiation (wave-length less than 3,000 Angstrom units) and those excited by radiation of longer wave-lengths. He mentioned that for discharge tubes the sulphides at first employed had been replaced by silicates and tungstates. As for many purposes it was desirable to use mixtures of different materials, the additive nature of the mixture had to be borne in mind. When pigments were mixed the resulting colour was that due to a subtractive mixture, so that, for instance, blue and yellow pigments when mixed gave a green. With fluorescent substances, however, matters were quite different, blue and red when mixed in proper proportions, for instance, would give an apparently yellow light. In the low pressure mercury discharge lamps the mixture of fluorescent materials was

so chosen that the resulting light was a fairly close approximation to white.

Mr. Jenkins mentioned the use of fluorescent materials activated by radium or mesothorium preparations for such purposes as the marking of instrument dials. He also described methods of making fluorescent glasses and of incorporating fluorescent materials in plastics or in vitreous enamels.

Both Dr. Strange and Mr. Jenkins illustrated their remarks with a number of striking demonstrations which, as usual, were very appreciatively received by their audience.

Fluorescent Lamps

"The Photometry and Colorimetry of Fluorescent Lamps" were dealt with in a very instructive paper by Mr. G. T. Winch, a colleague of Mr. Jenkins at the Wembley laboratories, who first gave a brief history of this type of lamp and described the stages leading up to the development of the familiar 80-watt, 5-ft. tube. After showing on the screen the circuits used and the electrical characteristics of these lamps, Mr. Winch dealt with the photometry of discharge tubes of all types, not only the 80-watt near-white. He said that this introduced all the difficulties and uncertainties of heterochromatic photometry, and for visual work it was usual to employ a small (2°) field and a colour filter giving, in combination with a tungsten lamp, a reasonably close match with the lamps to be measured. The transmission factor of the filter for the light from the tungsten lamp had to be calculated from its spectral transmission curve as found on the spectrophotometer. In photoelectric photometry the use of a colour filter to correct the spectral sensitivity curve of the cell had certain disadvantages, and the speaker preferred the artificial eye, previously described in a paper to the I.E.S. (Trans., 5, p. 93, Aug., 1940).

For measuring the lumens from a 5-ft. tube it was found convenient to use as integrator a box 6 ft. by 2 ft. by 2 ft., with a diffusing window and rectifier cell. It was, of course, essential to use as substandard a lamp of the same type which had been previously calibrated.

To evaluate the colour-rendering properties of a lamp, the first method employed was to measure the red-ratio by means of a filter (see "Light and Lighting," 27, p. 123, Apr., 1934). Later on an improved method, a kind of abbreviated spectrophotometry in which the visible spectrum was divided into eight bands, was developed (see I.E.S. Trans., 7, 1942, p. 65). The lamps produced by various manufacturers were compared, said Mr. Winch, with pairs of lamps which acted as colour-rendering limit gauges, the corresponding members of the various pairs being as nearly as possible identical in colour. The objective as regards colour-rendering was arrived at by a "jury" method, in which different familiar objects were viewed under (a) C.I.E. Standard Illuminant B (approx. sunlight) and (b) fluorescent tubes giving various approximations to white light.

Colour Printing

Mr. F. W. Coppin, of Messrs. Kodak, Ltd., described a very interesting and novel application of fluorescence in his paper, "The Use of Fluorescent Pigments in Colour Printing." The metal plates used in colour printing, which were prepared from the ordinary colour-separation negatives, had to be fine-etched by hand in order to allow for the colour-mixing characteristics of the coloured inks used in the printing process. Recently, however, it had been found possible, by incorporating a fluorescent material in the pigments used for painting the original picture, to make this allowance automatically. The picture was painted by the artist in ordinary light so that the fluorescence was not apparent. Then the colour separation negatives were made by the light from an arc-lamp, in which the proportion of ultra-violet to visible light was adjusted so that the effect of the fluorescence automatically corrected the negatives to allow for the characteristics of the inks most usually employed. The process could not, of course, be used unless the original picture could be painted with the special pigments containing the fluorescent material.

Literature on Lighting

(Abstracts of Recent Articles on Illumination and Photometry in the Technical Press)

(Continued from p. 148, November, 1942)

(Continued from p. 148, November, 1942)

PHOTOMETRY

113. Illumination from Arrays of Rectangular Sources. Domina Eberle Spencer. Journal of the Optical Society of America. Vol. 32, No. 9. September, 1942. A mathematical treatment of the subject leading to a series of general equations for the illumination at any point from one or two dimensional arrays of any number of rectangular sources. Approximate formulae are derived from the exact equations and the errors so introduced are claimed by the author to be less than one per cent. for the range of values occurring in illuminating engineering practice.
H. J. T.

SOURCES OF LIGHT

114. 3,000-watt Mercury Lamp. C. L. Amick. Magazine of Light, XI, No. 4, pp. 10-15, June, 1942. The 3,000-watt Mercury lamp is a tubular source about $1\frac{1}{4}$ inches in diameter. The distance between electrodes is about 4 ft. It has a rated life of 2,000 hours and is very suitable for high bay lighting in trough reflectors. The output of the bare lamp, after 100 hours, is 120,000 lumens. It requires an autotransformer.
C. A. M.

LIGHTING EQUIPMENT

115. High Lights and Side Lights. Flow Detection. Anon. General Electric Review, Vol. 45, No. 9, September, 1942. A short article dealing with the use of sodium light for the microscopic examination of materials for flaws, cracks, and pits.
H. J. T.

116. Germicidal Lamps. L. J. Buttolph. Magazine of Light, XI, No. 2, pp. 8, 9, and 41, March, 1942. A discussion is given of the potential value of germicidal lamps with instances of their successful use.
C. A. M.

117. Fading. M. Luckiesh, A. H. Taylor. Magazine of Light, XI, No. 3, p. 36, April, 1942. A brief note is given on the relative fading properties of American Mazda C and Mazda F lamps compared with sunlight plus skylight.
C. A. M.

118. Efficient New Circuit. Anon. Magazine of Light, XI, No. 5, pp. 36-37, July, 1942. It has been found possible to run two 100-watt lamps in series with one control unit. The combination of two such pairs of lamps with a condenser in the circuit of one produces a split-phase circuit and enables one ballast to control four lamps.
C. A. M.

119. Prescription for War Production. Anon. Magazine of Light, XI, No. 1, p. 6, February, 1942. Details and a photograph are given of an artificial skylight. The skylight is 12 ft. x 28 ft., each panel 2 ft. x 4 ft., being fitted with four 40-watt fluorescent lamps.
C. A. M.

APPLICATIONS OF LIGHT

120. The American Indoor Black-out Lamp. L. C. Porter. Magazine of Light, XI, No. 4, pp. 8-9. June, 1942. Details are given of the newly standardised indoor black-out lamp. It consumes 15 watts, the bulb being coated with an opaque black covering except for a circular aperture on the end of the bulb not more than one inch in diameter. This aperture is orange in colour. The total luminous output must range between $1\frac{1}{2}$ and 3 lumens. Regulations exist on the use of these lamps. Only one can be used over 200 sq. ft. or less of floor area. In narrow passages a minimum of spacing of 15 ft. is required.
C. A. M.

121. High Level Lighting. Anon. Magazine of Light, XI, No. 1, pp. 16-18, February, 1942. Three interesting examples of the use of fluorescent tubes in factory lighting in America are given. One is an example of the use of fluorescent tubes for corridor lighting. In the second continuous troffers at 4 ft. centres give 40 ft.c. at 10 ft. mounting height, using 40-watt lamps. The third example is a large assembly department where each fitting is equipped with two 100-watt fluorescent lamps, the fittings being at 9 ft. 6 in. by 10 ft. spacing at 13 ft. 9 in. mounting height, and giving 40 ft.c.
C. A. M.

122. Guide for 50 ft.c. Anon. Magazine of Light, XI, No. 1, pp. 19-22, Feb., 1942. Data are given for rooms of various sizes, with light or medium finish, on the installation of various types of tubular fluorescent lamp fittings. The data are given in the form of the area in square feet per 40-watt fluorescent lamp in an installation that will

give 50 ft.c. in service. Fixture efficiency data for a complete range of such fittings are also given. C. A. M.

123. Fluorescent Lighting. Anon. Elect., 129, p. 565, Nov. 20, 1942. Particulars are given with a photograph of a successful installation of 5-ft. fluorescent tubular lamps in a dissecting room at a medical school. C. A. M.

124. 3,000-watt Lamps. Frank Schmeller. Magazine of Light, XI, No. 5, pp. 28-29, July, 1942. A description with photographs is given of the conversion of the lighting of a foundry with bare lamps giving 2 ft.c to an installation of 3,000-watt mercury lamps in trough reflectors that gave an average of 35 ft.c. Provision has been made for easy maintenance. C. A. M.

125. First Aid Recommendations. Anon. Magazine of Light, XI, No. 3, pp. 13-15, April, 1942. Individual problems arising in industrial lighting of direct, daylight, or reflected glare, shadows, etc., are dealt with and solved in a series of cartoon-diagrams. C. A. M.

126. Lighting Maintenance in War Industry Plants. A. K. Gaetjens. Magazine of Light, XI, No. 5, pp. 16-22, July; No. 6, pp. 13-22, Sept., 1942. Detailed results of a survey of war industry installations, from the aspect of maintenance, are given and discussed. The second part of this article deals with the more practical aspects of maintenance—access to fittings, washing facilities, etc. C. A. M.

127. High Bay Installations. Anon. Magazine of Light, XI, No. 6, p. 35, Sept., 1942. A system of 3,000-watt mercury lamps and twin lamp 1,500-watt filament units on 25-ft. centres provides 50 ft.c. in an industrial installation. The mounting height is 54 ft. C. A. M.

128. Auditorium Lighting. Anon. Magazine of Light, XI, No. 4, pp. 24-28, April, 1942. An interesting example of decoration by light is given in an auditorium in Milwaukee. Circuits allow five different effects to be produced. C. A. M.

129. Insect Invaders. L. C. Porter, G. F. Prideaux. Magazine of Light, XI, No. 3, pp. 38-42, April, 1942. The results are given of a study of the use of coloured lamps as insect traps. In general the closer the light approaches the blue end of the spectrum, the more insects are trapped. C. A. M.

Lighting an Indoor Swimming Bath

Ceiling floodlights and a system of underwater lighting are features of this new swimming bath, a scheme initiated before the war but only recently completed and put into service in the Midlands. The lighting, designed by engineers of the General Electric Co., Ltd., comprises twelve 500-watt floodlights flush with the ceiling and twelve parabolic units (also 500-watt) mounted behind rectangular portholes.